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No. XXXVI.



Description and Rationale of the operation of a simple apparatus, which may serve as a substitute for the Ship Pump, and which will require no manual labour whatever; being a Supplement to the paper No. XXIX. on that subject. By Robert Patterson.—Read, Dec. 5, 1817.

DESCRIPTION.

THE apparatus for the purpose announced in the above title, consists of a long hose, made of pretty stiff leather, passing through the stern of the vessel; the inner end furnished with a copper ferrule, and having a valve opening inwards, is to be immersed under the surface of the water in the hold, and the outer end to fall into the water a-stern of the vessel. This end of the hose is to terminate in a piece of copper tube, of a convenient length, with three or more large holes pierced through its circumference, near the extremity; and to be closed at the end by a moveable lid, projecting a small distance beyond the circumference of the tube. This tube is to be introduced (the lid being removed for the purpose) into a broad metallic socket, (bell-metal or copper) from which project three or more diverging spiral tubes, opening into the socket; which must be made to turn freely, and with as little friction as possible, round the copper tube, and covering the holes

perforated through it ; the lid being replaced, will prevent the socket from slipping off.

Round the socket, and behind the projecting spiral tubes, are to be firmly fixed, obliquely, three or more copper vanes, resembling those of a vertical wind-mill.

Along the surface of the copper tube, in which the hose terminates, may be fixed an oblong sheet of cork, projecting a small distance above the tube. This will answer two purposes, 1st, by its buoyancy, it will, when the vessel is in motion, prevent the spiral tubes from sinking too much below the surface of the water ; and 2dly, it will counteract the tendency which the friction of the socket, turned round by the rotary motion of the vanes striking against the water, will have to twist the leathern hose.

That part of the hose which passing through, comes in contact with the stern of the vessel, may be made of a strong, curving, copper tube, by which it may be fastened to the vessel, and thus be prevented from being dragged out or twisted round by the action of the water. Into the upper bend of this part of the hose may be inserted a small diverging copper tube, through which, by means of a funnel, the hose may be filled with water, or the air which may there accumulate, suffered to escape, and may then be stopped with a cork.

RATIONALE OF THE OPERATION.

The hose being previously filled with water, and the vessel under way, the action of the water against the vanes attached to the socket, will, in ordinary circumstances, produce so great a centrifugal velocity in the outer extremities of the spiral tubes, as to overcome the external pressure of the water, and produce a current from the water in the hold, on the principles mentioned in the original paper, so long as it covers the inner extremity of the hose. If the motion of the vessel should cease, or become too slow to produce the exhaustion of the water from the hold, then the valve at the inner extremity of the hose will be shut, and the hose remain

full, till a favourable change of circumstances shall renew the operation.

There is no doubt, that the above apparatus is susceptible of various modifications and improvements, which will readily occur to the practical navigator.

A centrifugal pump is not a new idea—I remember to have seen one in Bucks county, above fifty years ago ; constructed by Joseph Ellicot, the father of our associate Andrew Ellicot, by which water was raised from a pretty deep well, for the purpose of irrigation, the rotary motion being communicated to the pump by a simple wind-mill.